



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,672	12/28/2006	James J Croft III	00025-22151.PCT.US	1694
20551 7590 02/03/2011 THORPE NORTH & WESTERN, LLP. P.O. Box 1219 SANDY, UT 84091-1219				
EXAMINER LEE, PING				
ART UNIT		PAPER NUMBER		
2614				
NOTIFICATION DATE		DELIVERY MODE		
02/03/2011		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

rich@tnw.com  
causse@tnw.com  
patentdocket@tnw.com

# Office Action Summary

**Application No.**

10/575,672

**Applicant(s)**

CROFT, JAMES J

**Examiner**

Ping Lee

**Art Unit**

2614

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 63-82 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 63-82 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

1. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 1-20 been renumbered as claims 63-82 respectively.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 63-70 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 63 recites the limitation "the second modulated ultrasonic carrier signal" in line 15. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 63, lines 9-10, the limitation "the first modulated ultrasonic carrier signal including said first parametric channel signal" is not consistent with the limitation "a first parametric channel signal including a first modulated ultrasonic carrier signal" as specified on lines 4-5. In other words, one can define an element A including an element B. However, it is not proper to define the same element B including element

A. The same defect as applied to the limitation "the second modulated ultrasonic carrier signal including a second parametric channel signal" as specified on lines 15-16.

Claim 68 recites the limitation "the first orientation of the first parametric ultrasonic beam" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 63-66, 73-75, 78, 80 and 81 are rejected under 35 U.S.C. 102(e) as being anticipated by Sasaki et al. (hereafter Sasaki, US006807281B1).

Regarding claim 63, Sasaki discloses a virtual headset apparatus (see Fig. 24), facilitating isolation of first and second channel signals of audio material to be heard by

a listener without need for placement of earphones or other audio transducer apparatus immediately adjacent the ears of a listener (col. 18, lines 15-16), comprising:

a parametric ultrasonic signal source (50) supplying a first parametric channel signal including a first modulated ultrasonic carrier signal and a second parametric channel signal including a modulated ultrasonic carrier signal;

a first electro-acoustical emitter portion (part of 154) electrically coupled to said signal source and configured to create a first parametric ultrasonic signal beam directable to a first ear of a listener, conveying the first modulated ultrasonic carrier signal including said first parametric channel signal to be parametrically reproduced at the first ear isolated from reflections from a surrounding environment and from said second modulated ultrasonic carrier signal at the first ear; and

a second electro-acoustical emitter portion (another part of 154) electrically coupled to said signal source and configured to create a second parametric ultrasonic signal beam directable to a second ear of a listener, conveying the second modulated ultrasonic carrier signal including a second parametric channel signal to be parametrically reproduced at the second ear isolated from reflections from a surrounding environment and from said first modulated ultrasonic carrier signal at the second ear (col. 18, lines 10-12);

the apparatus providing said first and second channel signals to said first and second ears so that audio material parametrically reproduced at the other of the first and second ear will be reduced sufficiently in sound pressure level at the other of the first and second ears that the first and second channel signals directed to each of the

first and second ears, respectively, will predominate, and the apparatus can provide at least one of: (a) isolation of the listener from reflections in a listening environment; and, (b) facilitation of spatialization directly from said parametric channel signals without providing transducers immediately adjacent each ear (col. 18, lines 15-25).

Regarding claims 64 and 65, by providing stereophonic sound (col. 18, lines 15-25), the apparatus as disclosed in Sasaki meets the claimed limitation that the second parametric channel signal is different from the first parametric channel signal, and the limitation that the first and second parametric channel signals contain left and right audio channel information.

Regarding claim 66, Sasaki shows that one of said electro-acoustical emitter portions includes an electrically sensitive and mechanically responsive (ESMR) film (piezoelectric devices 50; col. 18, line 8).

Regarding claim 73, Sasaki discloses (Fig. 24) a parametric loudspeaker system for enabling acoustic differentiation of amplitudes of audio material arriving at coordinated first and second reception points within a listening location, comprising: a. a parametric ultrasonic signal source (50) supplying at least a first and a second parametric ultrasonic channel signal, each channel signal having an ultrasonic carrier signal and at least one sideband containing audio information; and b. an electro-acoustical emitter (154) capable of orienting at least a first parametric ultrasonic wave corresponding to the first parametric ultrasonic channel signal along a first orientation for dominant reception at the first reception at an acoustic level substantially greater than at the second reception point, and a second parametric ultrasonic wave

corresponding to the second parametric ultrasonic channel signal along a second orientation for dominant reception at the second reception point at an acoustic level substantially greater than at the first reception point, thereby enabling acoustic differentiation of amplitudes arriving at each reception point.

Regarding claim 74, Sasaki discloses that the respective first and second reception points are the first and second ears of a listener.

Regarding claim 75, Sasaki discloses that localized sound is generated at more than one listening location.

Regarding claim 78, Sasaki discloses a method for enabling binaural listening to audio material by a listener without need for earphones or other physical audio producing devices attached to the listener (col. 18, lines 15-16), the method comprising:

- a. generating a first parametric ultrasonic signal by parametrically modulating a first channel audio input signal with an ultrasonic carrier signal;
- b. generating a second parametric ultrasonic signal by parametrically modulating a second channel audio input signal with the ultrasonic carrier signal (col. 18, lines 6-12);
- c. applying the first and second parametric ultrasonic signals to an electro acoustic emitter (154) while employing an orientation control technique (although not shown, it is inherently provided) at an emission surface of the emitter to direct a first parametric ultrasonic wave towards a left ear of the listener, and a second parametric ultrasonic wave towards the right ear of the listener (see the result as illustrated in Fig. 24); and

d. emitting the first and second parametric ultrasonic waves simultaneously from the electro- acoustic emitter, resulting in a corresponding first decoupled audio wave being detected predominately at the left ear of the listener, and a second decoupled audio wave being detected predominately at the right ear of the listener, thereby enabling acoustic differentiation of amplitudes arriving at each ear (col. 18, lines 15-25).

Regarding claim 80, Sasaki discloses a method for creating a virtual headset minimizing cross-talk (binaurally as in col. 18, lines 15-16) between output waves of at least a first audio output device and a second audio output device, the method comprising:

a. generating a first parametric ultrasonic signal by parametrically modulating a first channel audio input signal with an ultrasonic carrier signal;

b. generating a second parametric ultrasonic signal by parametrically modulating a second channel audio input signal with the ultrasonic carrier signal (col. 18, lines 7-12);

c. directing the first audio output device towards a first reception point of a listening location;

d. directing the second audio output device towards a second reception point of the listening location (see the result as illustrated in Fig. 24);

e. applying the first parametric ultrasonic signal to the first audio output device, resulting in a first parametric ultrasonic wave which arrives at the first receiving point at an acoustic level sufficiently greater than at the second receiving point to enable acoustic differentiation of amplitudes arriving at each reception point; and



f. simultaneously applying the second parametric ultrasonic signal to the second audio output device, resulting in a second parametric ultrasonic wave which arrives at the second receiving point at an acoustic level sufficiently greater than at the first receiving point to enable acoustic differentiation of amplitudes arriving at each reception point.

Regarding claim 81, Sasaki discloses that the respective first and second reception points are left and right ears of a listener.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 67-72, 76, 77, 79 and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki.

Regarding claims 68 and 69, for the embodiment as illustrated in Fig. 24, Sasaki fails to show a target element and a tracking circuit coupled to the electro-acoustical emitter portions for coordinating the first orientation of the first parametric ultrasonic beam to follow movement of the target element. However, in other embodiments as shown in Figs. 27 and 28, Sasaki specifically teaches a tracking circuit to follow the movement of the listener in order to direct the sound to the listener's location. Thus, it would have been obvious to one of ordinary skill in the art to modify the embodiment as

shown in Fig. 24 of Sasaki in view of Fig. 27 or 28 of Sasaki by incorporating the tracking circuit in order to provide the binaural sound to the listener even if the listener moves.

Regarding claim 70, although not explicitly discussed in Sasaki, the target element (the listener's body) is worn by the listener to enable the tracking circuit to locate the position of the listener's ears.

Regarding claim 82, for the embodiment as illustrated in Fig. 24, Sasaki fails to show the steps of tracking the location of the listener; and, beam-steering the output waves of the first and second audio output devices towards said left and right ears. However, in other embodiments as shown in Figs. 27 and 28, Sasaki specifically teaches a tracking circuit to follow the movement of the listener in order to direct the sound to the listener's location. Thus, it would have been obvious to one of ordinary skill in the art to modify the embodiment as shown in Fig. 24 of Sasaki in view of Fig. 27 or 28 of Sasaki by incorporating the tracking circuit in order to provide the binaural sound to the listener even if the listener moves.

Regarding claims 67, 71, 72, 76, 77 and 79, for the embodiment as illustrated in Fig. 24, Sasaki fails to show a phase-controlling circuitry to enable differential phase controlling of the first and second parametric ultrasonic beams as they are emitted from said first and second electro-acoustical emitter portions such that the first parametric ultrasonic wave beam may be directed at the first ear of the listener, wherein the electro-acoustical emitter structure includes multiple isolated emitting portions, at least two being driven by the first parametric ultrasonic channel signal, wherein at least one

isolated emitting portion is driven with a signal having a phase differential as compared to the other isolated emitting portions to enable beam steering of the parametric ultrasonic beam. However, in other embodiments such as Figs. 27 and 28, Sasaki teaches the tracking mechanism to direct the beam following the listener's movement. In other embodiment as shown in Fig. 15, Sasaki teaches using phase control to direct the beam to different direction as needed. Thus, it would have been obvious to one of ordinary skill in the art to modify the embodiment as shown in Fig. 24 of Sasaki in view of Figs. 27 or 28 and 15 of Sasaki by incorporating the tracking circuit and phase control mechanism in order to provide the binaural sound to the respective ears of the listener even if the listener moves.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ping Lee whose telephone number is 571-272-7522. The examiner can normally be reached on Wednesday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian C. Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ping Lee/  
Primary Examiner, Art Unit 2614

pwl